

U.S. Patent Application No. 10/810,386
Amendment After Non-Final Office Action
Reply to Office Action dated September 4, 2007

REMARKS/ARGUMENTS

This is a reply to the Office Action dated September 4, 2007.

Claims 1-14 are currently pending in this application. Claims 1-4 have been withdrawn.

New claims 13 and 14 are currently added. No claim is canceled.

Claim 6 is editorially amended.

New claims 13 and 14 have support at page 8, lines 17-24, and elsewhere in the present application. No new matter has been introduced by this amendment.

Interview Summary

The Applicants acknowledge with appreciation the courtesy of the interview granted by the Examiner to the Applicants' representatives, Valerie Calloway and Ramon R. Hoch, on October 17, 2007. This interview summary is responsive to the Examiner's Interview Summary provided to Applicants' representatives at the conclusion of the interview.

During the interview, the Applicants' representatives discussed the advantages obtained from the combination of the two nonwoven layers having the particular fiber compositions as recited in the present claims. The Applicants' representatives also discussed that the claim recitation of "lycocell" is a term of art having a recognized different meaning than the FR phenol oxidized polysaccharide reaction products made by Kierulff after chemical conversion of the lyocell or other reaction starting materials. The Examiner indicated that Applicants may present evidence and/or arguments to establish that lyocell fibers have a different chemical structure than the product fibers disclosed by Kierulff, and that such a showing would overcome the obviousness rejection of record. It was also clarified that the Kelly reference is relied upon for the feature of hydroentanglement, and the Paire reference is not being relied upon in the obviousness rejection set forth in the most recent Office Action.

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Response to 35 U.S.C. §103(a) obviousness rejection of Claims 5-12

Claims 5-12 have been rejected as being obvious under 35 U.S.C. §103(a) over Mater et al. (WO 2003023108 referenced as U.S. Pat. Appln. Publ. No. 2004/0198125 A1) in view of Kierulff (U.S. Pat. No. 6,660,503) and Kelly (U.S. Pat. Appln. Publ. No. 2002/0004348 A1).

The most recent Office Action indicates that Mater teaches nonwoven flame barrier fabrics, and blends of fibers, preferably to combine category 1 and 2 (para-amids and modacrylics) because of synergistic charring effect. The Office Action also indicates that Mater teaches blending of flame retardant fibers to overcome disadvantages of previous fibers for example hydroentangled nonwoven spunlace flame barriers containing significant amounts of para-aramid fibers that impart a yellow color.¹ The Office Action indicates that Mater differs from the present application in that it does not teach a lyocell fiber and does not teach hydroentangling layers together. According to the Office Action, Kierullf teaches that a natural fiber of lyocell could be substituted for a synthetic fiber or a natural fiber in order to achieve the improved properties that include flame retardance. The Office Action indicates that Kelly teaches a hydroentangled nonwoven flame-retardant fabric consisting of a blend of melamine and aramid fibers. Also according to the Office Action, it would have been obvious to one of ordinary skill in the art to employ fiber blends in the ranges of Mater motivated to reduce the yellowing of a para-amid fiber and maintain the flame retardant properties of the fabric, and to employ a layered blend motivated to incorporate synergistic advantages of different types of flame retardant fibers. The Applicants respectfully traverse the rejection for the following reasons.

The present invention is directed towards a structurally stable, hydroentangled, flame-retardant nonwoven fabric comprising a first and a second layer. The first layer is a blend of lyocell fiber and modacrylic fiber, and the second layer is a blend of lyocell fiber, modacrylic fiber, and para-amid fiber. The lyocell and modacrylic fiber combination in the first fabric layer provide a strong and soft layer in which the lyocell and modacrylic fiber combination form a char rather than melt when burned, and the fabric integrity remains structurally stable due to para-amid fiber in the second fabric layer. The presence of molten polymer material during combustion of a flame retardant fabric material is undesired. The lack of para-amid fiber in the first layer of the flame-retardant nonwoven fabric of the present invention masks the

¹ As ostensibly appreciated in the Office Action, the terms “para-aramid” and “para-amid” have been used interchangeably in the lexicon of this art (e.g., also see U.S. Pat. No. 6,233,978).

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discoloration of the second layer that may occur from the presence of the para-amid fiber therein (see specification: page 4, lines 1-18).

The Applicants observe that although Mater indicates in the “BACKGROUND OF THE RELATED ART” section of the reference (paragraph [0014]) that p-aramid (para-amid) can create a yellowing problem, as discussed in the Office Action, Mater but does not teach how to fix or solve the problem if para-amid fiber is included in a fabric. In fact, Mater, in the referenced paragraph [0014] thereof, indicates that the yellowing problem is particularly onerous when the fiber is used directly under white/light-colored fabrics. This teaching of Mater teaches away from possible consideration of multi-layer assemblies such as provided in the present invention to address para-amid yellowing problems. The present invention provides a solution to the yellowing problem otherwise associated with para-amid fiber that uses a *multi-layered* fabric configuration that still includes para-amid fiber.

With respect to the Kelly reference, it discloses an entangled nonwoven fabric with thermal protective fibers comprising a single precursor web consisting of a blend of aramid fibers and melamine fibers that is hydroentangled to itself, and not to a separate nonwoven fabric layer. Kelly therefore fails to teach, suggest or predict the success of hydroentangling separate discrete nonwoven fabric layers together, nor for multiple layers each including lyocell and modacrylic fibers instead of melamine.

With respect to the Kierulff reference, the Applicants point out that the present claims recite a component fiber included in each of the first and second layers that is lyocell *per se*, and not reaction products that may be made from lyocell as a possible starting material only but are chemically and structurally different from lyocell.

Attention is also kindly directed to the concurrently submitted Rule 132 Declaration of co-inventor Herbert Hartgrove (the “Hartgrove Declaration”). The Hartgrove Declaration provides a technical opinion and assessment of the teachings of Kierulff as compared to the fiber materials recited in the claims of the present invention. The Hartgrove Declaration explains that Kierulff teaches chemical modification of oligo- or polysaccharides by an enzymatic process in which a phenol oxidizing enzyme such as peroxidase or laccase is used in combination with an enhancing agent. As explained, the product of these reactions taught in Kierulff are different chemically and structurally from the original starting material such as lyocell. The Hartgrove Declaration also explains that Kierulff teaches that the new compound made by the reactions can

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have flame retardancy or other properties imparted thereto, but Kierulff does not teach or suggest lyocell itself is a flame retardant fiber. The Hartgrove Declaration also provides that a person having ordinary skill in the nonwoven art would not have read Kierulff as teaching, suggesting or predicting the unexpected results obtained by the combination of lyocell with modacrylic in one fiber layer and in combination with modacrylic and para-amid fibers in another fiber layer hydroentangled thereto according to this invention.

In view of the above, the relied upon Mater, Kierulff and Kelly references for this rejection, either individually or in the proposed combination, fail to teach or suggest every claimed recitation. Therefore, the present claims are not rendered *prima facie* obvious over these references, and factual evidence has been submitted in the Hartgrove Declaration to rebut any such case if made.

In view of the above, reconsideration and withdrawal of this rejection is requested.

It is believed that this application is in condition for allowance, and notice of such is respectfully requested.

If the Examiner believes that a teleconference would be useful in expediting the prosecution of this application, the official is kindly invited to contact Applicants' undersigned representative of record.

Respectfully submitted,

/Ramon R. Hoch/
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